

JAPANESE [JP,07-039921,U]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE  
INVENTION TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF  
DRAWINGS DRAWINGS

[Translation done.]

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DETAILED DESCRIPTION

[Detailed explanation of the device]

[0001]

[Industrial Application]

A majority of this device is related with the hollow fiber decollator which surrounds this bunch with a protective tube and catches a suspended solid, an impurity, etc. in the peripheral face of a hollow fiber while bundling the upper bed of the hollow fiber of a book with a predetermined interval and fixing in one.

[0002]

[Description of the Prior Art]

Drawing 6 is a sectional view showing an example of the conventional hollow fiber decollator typically.

In drawing 6, 1 is shown and a hollow fiber PVA, poly SARUHON, polyether sulphone, An upper bed is wide opened with polyolefine, polypropylene, polyethylene, etc., a lower end is blockaded and it is constituted, and an outer diameter shall set an inside diameter to about 1.6 mm, it shall be about 1 mm, length shall be 1500 mm, and a filtration area is about 0.0075m<sup>2</sup>.

2 shows a hardening layer, comprises binders, such as an epoxy resin system, bundles many upper bed parts of the hollow fiber 1 of a book with a predetermined interval, and fixes them in one.

[0003]

3 shows raw water and the protective tube which has a hole which can pass washing air, and comprises a network etc.

4 shows a cartridge frame, comprises Noryl resin, polysulfone resin, etc., and fixes the upper bed part of the protective tube 3 to the peripheral face of the hardening layer 2.

1a is a boundary line of the hardening portion which the binder which shows a boundary part and constitutes the hardening layer 2 permeated the hollow fiber 1, and hardened, and the non-hardening portion in which a binder does not permeate the hollow fiber 1.

[0004]

Next, filtration etc. are explained.

First, if the raw water which a suspended solid, an impurity, etc. are mixing in the surroundings of the hollow fiber 1 is pressurized and it lets water flow, a suspended solid, an impurity, etc. are caught by the peripheral face of the hollow fiber 1, and only water will penetrate the hollow fiber 1 and will be discharged as treated water from the upper bed of the hollow fiber 1.

And when suspended solids, impurities, etc. which were caught in the peripheral face of the hollow fiber 1 increase in number and differential pressure (difference of appliance inlet pressure and an outlet pressure) reaches a specified value, A back wash is carried out, the hollow fiber 1 is vibrated by the shearing force of the airstream generated by making a suspended solid, an impurity, etc. exfoliate or contacting air bubbles to the peripheral face of the hollow fiber 1 from the lower part, and a suspended solid, an impurity, etc. are made to exfoliate by pressing treated water fit from the

upper bed of the hollow fiber 1.

[0005]

Drawing 7 is a sectional view showing other examples of the conventional hollow fiber decollator typically, gives identical codes to a portion the same as that of drawing 6, or considerable, and omits explanation.

In drawing 7, 5 shows a hardening layer, comprises binders, such as an epoxy resin system, bundles many lower end parts of the hollow fiber 1 of a book with a predetermined interval, and fixes them in one, and 5 h of breakthroughs for making water and air flow are provided.

6 shows a cartridge frame, comprises Noryl resin, polysulfone resin, etc., and fixes the lower end part of the protective tube 3 to the peripheral face of the hardening layer 5.

Since it becomes being the same as that of the case of drawing 6, explanation of filtration etc. is omitted.

[0006]

[Problem(s) to be Solved by the Device]

Since the lower end part of the hollow fiber 1 serves as the free end, if it contacts airstream from the lower part and the hollow fiber 1 is vibrated, the boundary part 1a will be made into a fulcrum, and, as for the hollow fiber filter shown in conventional drawing 6, the hollow fiber 1 will vibrate. Thus, when the hollow fiber 1 vibrates, there was inconvenience of the boundary part 1a having got fatigued and being easy to fracture the hollow fiber 1.

[0007]

As for the hollow fiber decollator shown in drawing 7, since both ends are being fixed in the hardening layers 2 and 5, it becomes insufficient the hollow fiber's 1 vibrating and a suspended solid, an impurity, etc. become difficult to exfoliate from the peripheral face of the hollow fiber 1.

And since the hardening portion which does not perform filtration in the lower end part of the hollow fiber 1, either was made, when it was considered as the same size, there was inconvenience that a filtration area decreased.

The air bubbles not necessarily enough for washing do not necessarily go into the inside of a hollow fiber from 5h of breakthroughs, and there was inconvenience that detergency was insufficient.

[0008]

This device was made in order to cancel inconvenience which was described above, it can make a suspended solid, an impurity, etc. which were caught in the peripheral face exfoliate certainly, without making a hollow fiber fracture, and provides the hollow fiber decollator which can fully secure a filtration area.

[0009]

[Means for solving problem]

The hollow fiber decollator concerning this device provides the attachment component which penetrates a hollow fiber to a protective tube so that vibration is possible.

[0010]

[Function]

If the hollow fiber decollator in this device vibrates a hollow fiber by the shearing force of the airstream generated by contacting air bubbles to the peripheral face of a hollow fiber from the lower part, a hollow fiber will vibrate in the range of a protect member.

Thus, by regulating the buffet region of a hollow fiber by a protect member, the stress concerning the boundary part of a hollow fiber can be stopped, and a hollow fiber can fully be vibrated.

[0011]

[Working example]

Hereafter, the working example of this device is described based on figures.

The sectional view and drawing 2 in which the hollow fiber decollator whose drawing 1 is the 1st working example of this device was shown typically are an expansion part top view of the lower end part of the 1st working example, give identical codes to a portion the same as that of drawing 6 and

drawing 7, or considerable, and omit explanation.

[0012]

In these figures, 7 showed a network illustrated as an attachment component by which hot welding was carried out to a peripheral face lower end part of the protective tube 3 in an outer peripheral part, and a lower end part of the hollow fiber 1 has penetrated it movable in meshes of a net. And length which the hollow fiber 1 penetrates under the network 7 is made into length which does not escape from meshes of a net of the network 7 even if it vibrates the hollow fiber 1, for example, 30 mm.

Since it becomes being the same as that of a conventional example, explanation of filtration etc. is omitted.

[0013]

Thus, when the hollow fiber 1 is vibrated by shearing force of airstream which will be generated by contacting air bubbles to a peripheral face of the hollow fiber 1 from the lower part if a hollow filament filter is constituted, a lower end part of the hollow fiber 1 has a moving range regulated with meshes of a net of the network 7.

Therefore, since stress concerning the boundary part 1a of the hollow fiber 1 can be stopped and the hollow fiber 1 can fully be vibrated, a suspended solid, an impurity, etc. which were caught to a peripheral face of the hollow fiber 1 can be made to exfoliate certainly.

And since a lower end part of the hollow fiber 1 which is the free end also has a filtration function and moreover is not being fixed, a cleaning effect increases and a filtration area can fully be secured.

[0014]

Drawing 3 is a fragmentary sectional view showing typically an important section of a hollow fiber decollator which is the 2nd working example of this device, gives identical codes to a portion the same as that of drawing 1, or considerable, and omits explanation.

In drawing 3, circulation of the water for which damage to the lower end of the hollow fiber 1 is protected shows a protection net with a free hole, and hot welding of 8 is carried out to the peripheral face lower end part of the protective tube 3 with the outer peripheral part of the network 7.

The lower end part of the hollow fiber 1 is not inserted in the protection net 8.

[0015]

Thus, by forming the protection net 8, it can protect so that the lower end part of the hollow fiber 1 besides the effect acquired in the 1st working example may not be damaged.

[0016]

Drawing 4 is a fragmentary sectional view showing typically the important section of the hollow fiber decollator which is the 3rd working example of this device, gives identical codes to drawing 1 - a portion the same as that of drawing 3, or considerable, and omits explanation.

In drawing 4, it shows a vibration isolation ring and comprises epoxy system resin, the lower end part of the protective tube 3 and the upper bed part of the protection net 8 are made to straddle 9, it wraps in hot welding or the protective tube 3, and the protection net 8, and adhesion solidification is carried out.

[0017]

Thus, raw water can be prevented from the holding part loosening and being revealed to the treated water side, when the lower end part of the protective tube 3, the hollow fiber 1, and the protection net 8 besides the effect acquired in the 2nd working example by forming the vibration isolation ring 9 vibrate and it fixes to a filter tower.

[0018]

Drawing 5 is a fragmentary sectional view showing typically the important section of the hollow fiber decollator which is the 4th working example of this device, gives identical codes to drawing 1 - a portion the same as that of drawing 4, or considerable, and omits explanation.

In drawing 5, 10 shows a vibration isolation ring, comprises binders, such as an epoxy resin system, and is attached to the lower end part of the protective tube 3.

And the network 7 and the protection net 11 are attached to the inner surface of this vibration isolation ring 10.

[0019]

Thus, by forming the vibration isolation ring 10 and the protection net 11, the same effect as the 3rd working example can be acquired.

The lower end part of the hollow fiber 1 is not inserted in the protection net 11.

[0020]

Here, at 30 mm, the diameter which bundled the 134 hollow fibers 1 manufactures the thing of a conventional example, and the thing of this invention for the hollow fiber element of  $1.0 \text{ m}^2$  respectively, and filtration areas are ferric oxide ( $\alpha\text{-Fe}_2\text{O}_3$ ), a tri-iron tetraoxide ( $\text{Fe}_3\text{O}_4$ ), and iron(III) hydroxide.

Mix ( $\text{FeO}(\text{OH})$ ) by the weight ratio of 35:35:30 and the synthetic water adjusted to 10 mg/l is used. It is considered as water flow rate-of-flow 0.4 m/h with an external pressure type, and when water flow differential pressure goes up to  $0.3\text{kg}/[\text{cm}^2]$  rather than an initial value, in addition to the back wash by filtered water, the comparison result of the differential pressure rise value after performing washing by vibration according the peripheral face of the hollow fiber 1 to air bubbles 20 times is shown in Table 1.

[0021]

[Table 1]

| 差圧 (kg/cm <sup>2</sup> ) | 従 来 例   | この発明の実施例 |
|--------------------------|---------|----------|
| 新 品                      | 0 . 6 2 | 0 . 6 1  |
| 20回目の逆洗後の値               | 1 . 4 3 | 1 . 1 2  |
| 差圧上昇値                    | 0 . 8 1 | 0 . 5 1  |

According to this invention, it became clear that there were few rises of differential pressure compared with a conventional example so that he could understand also from this table 1.

[0022]

In each above-mentioned working example, it is desirable that a crack makes it hard to perform predetermined coating to the peripheral face of the hollow fiber 1 in contact with the network 7, and to stick with the network 7 to the peripheral face of the hollow fiber 1.

And as for the size of the meshes of a net of the network 7, it is desirable to consider it as 1.5 times - about 5 times of the yarn diameter of the hollow fiber 1.

Although what formed the network 7 in the lower end part of the protective tube 3 was illustrated, the network 7 may be formed in both the pars intermedia of the protective tube 3 or pars intermedia, and a lower end part.

[0023]

As long as the position of the network 7 is a position which stops the stress concerning the boundary part 1a of the pars intermedia of the protective tube 3, and not only a lower end part but the hollow fiber 1 and in which the hollow fiber 1 can fully vibrate, they may be other arbitrary positions of the protective tube 3.

And although what considered the attachment component as the network 7 was illustrated, as long as it permits vibration of the hollow fiber 1 in a certain range, they may be not only a network but other things.

[0024]

[Effect of the Device]

As mentioned above, since the attachment component which penetrates a hollow fiber so that vibration is possible was provided in the protective tube, the stress concerning the boundary part of a hollow fiber can be held down to it and a hollow fiber can fully be vibrated to it, a suspended solid, an impurity, etc. which were caught to the peripheral face of the hollow fiber can be made to exfoliate certainly according to this device.

And since a filtration function does not fall, the lower end part of the hollow fiber which is the free end can also fully secure a filtration area.

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PRIOR ART

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a sectional view showing typically the hollow fiber decollator which is the 1st working example of this device.

[Drawing 2]It is a partial enlarged plan view of the lower end part of the 1st working example.

[Drawing 3]It is a fragmentary sectional view showing typically the important section of the hollow fiber decollator which is the 2nd working example of this device.

[Drawing 4]It is a fragmentary sectional view showing typically the important section of the hollow fiber decollator which is the 3rd working example of this device.

[Drawing 5]It is a fragmentary sectional view showing typically the important section of the hollow fiber decollator which is the 4th working example of this device.

[Drawing 6]It is a sectional view showing an example of the conventional hollow fiber decollator typically.

[Drawing 7]It is a sectional view showing other examples of the conventional hollow fiber decollator typically.

[Explanations of letters or numerals]

1 Hollow fiber

1a Boundary part

2 Hardening layer

3 Protective tube

4 Telescopic frame

7 Network

8 Protection net

9 Vibration isolation ring

10 Vibration isolation pipe

11 Protection net

[Translation done.]

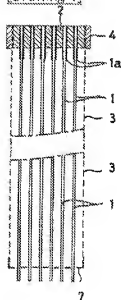
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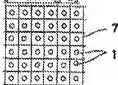
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## DRAWINGS

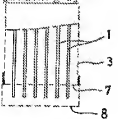
[Drawing 1]



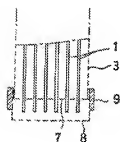
[Drawing 2]



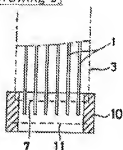
[Drawing 3]



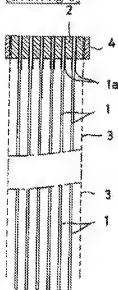
[Drawing 4]



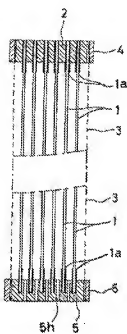
[Drawing 5]



[Drawing 6]



[Drawing 7]



[Translation done.]